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EXAMINER

DEBERADINIS, ROBERT L

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/854,422

Applicant(s)

HELMUT KINDER

Examiner

Robert L. DeBeradinis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on May 11, 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on May 11, 2001 is/are a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some\* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 6) ☐ Other:

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## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because the boxes are not labeled with their functional names.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4, 7-9, 22, 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A.

Regarding claims 1, 22.

WRIGHT discloses switching element for modifying the electric resistance comprising:

- a. at least one superconductor (2);
- b. means for irradiating electromagnetic high frequency onto the at least one superconductor ( column 5, lines 50-68).

WRIGHT does not disclose a high temperature semiconductor.

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FURUKAWA discloses manufacturing method of high temperature superconductor switch element.

It would have been obvious to one having ordinary skill in the art at the time of this invention to provide a switching element for modifying the electric resistance comprising at least one high temperature superconductor and means for irradiating electromagnetic high frequency onto the at least one high temperature superconductor to provide a power switch to control the application of power to a load.

Regarding claim 4.

WRIGHT discloses wherein the means (4) for irradiating the electromagnetic high frequency comprises at least one coil (6) arranged close to the at least one high temperature superconductor (2).

Regarding claims 7, 8, 9, 25, 26.

It would have been obvious to provide the electromagnetic high frequency in the form of a pulse to cause the superconductive device to become selectively nonsuperconductive for a pulsed duration time.

Claims 2, 5, 6, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over WRIGHT 3,732,438 in view of FURUKAWA JP 09129939 A in further view of STELZER DE 19928324 A1.

Regarding claims 2, 23.

WRIGHT in view of FURUKAWA disclose the switching element according to claim 1.

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WRIGHT in view of FURUKAWA do not disclose wherein the high temperature superconductor is provided as a thin layer of a high temperature superconductor.

STELZER discloses wherein the high temperature superconductor is provided in high temperature superconductor thin films.

It would have been obvious to one having ordinary skill in the art at the time of this invention to provide a switching element according to claim 1 wherein the high temperature superconductor is provided as a thin layer of a high temperature superconductor to provide quick response to temperature induced changes to provide fast switching response times.

Regarding claims 5, 6.

WRIGHT in view of FURUKAWA disclose the switching element according to claim 4.

WRIGHT in view of FURUKAWA do not disclose wherein the coil is provided as a flat coil arranged on the high temperature superconductor.

FURUKAWA discloses manufacturing method of switch element including junction layer energizing cross section of other part.

STELZER discloses wherein the high temperature superconductor is provided in high temperature superconductor thin films.

The above references provide an indication of the packaging knowledge known in the manufacturing method of high temperature superconductor power switches.

It would have been obvious to one having ordinary skill in the art at the time of this invention to provide a flat coil arrangement on the high temperature superconductor to provide

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the excitation means to raise the temperature of the superconductor in order to provide the switch actuation of the device.

4. Claims 3, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303.

Regarding claims 3, 24.

WRIGHT in view of FURUKAWA disclose the switching element according to claim 1, FURUKAWA discloses high frequency chopper ( column 2, line 50).

WRIGHT in view of FURUKAWA do not disclose wherein the high frequency is in the MHZ-range and in particular less than 200 MHZ.

ZEIGLER discloses injecting a current with a vary rapid rise time into the switch, the injected current being an RF to heat the superconductor to change the superconductor state ( column 3, lines 47-65).

It would have been obvious to one having ordinary skill in the art at the time of this invention to select a high frequency that produced the fastest switching time for the switching element to produce a fast power switch.

5. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303 and STELZER DE 19,928,324 A1.

Regarding claim 10.

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a) WRIGHT in view of FURUKAWA disclose a switch element according to claims 1, 4, 7-9). WRIGHT in view of FURUKAWA in further view of STELZER disclose a switch element according to claims 2, 5, 6. WRIGHT in view of FURUKAWA in further view of ZEIGLER disclose a switch element according to claim 3.

b) WRIGHT in view of FURUKAWA disclose a means for triggering the switching element by the irradiation of electromagnetic high frequency causing the switching element to become selectively superconduction state to non-superconduction state ( see WRIGHT col.3, lines 19-25).

WRIGHT in view of FURUKAWA do not disclose means for triggering the irradiation of electromagnetic high frequency in response to the detection that the maximally allowed current is exceeded.

STELZER discloses heating of coolant so that high temperature superconductor thin films can be used in high current-limiting devices.

ZEIGLER discloses injecting a current with a very rapid rise time into the switch causing resistive heating in the wire that is directly conducted to the superconductor, heating the superconductor above its critical temperature to switch the superconductor to its non-superconducting state to limit the current (column 3, lines 43-65). ZEIGLER also discloses that magnetically-actuated switches are known in the art (column 3, line 11).

It would have been obvious to one having ordinary skill in the art at the time of this invention to provide a means for triggering the irradiation of electromagnetic high frequency in

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response to the detection that the maximally allowed current is exceeded to provide current limiting for a magnetically-actuated high temperature superconductor switch element.

Regarding claim 11.

It is obvious that as long as the irradiation of electromagnetic high frequency is present the magnetically-actuated high temperature superconductor switch element will remain in the resistive state thus limiting the current.

Regarding claim 12.

WRIGHT discloses adiabatic change in temperature of crystals to switch or to augment the switching of a superconductive device (column 3, lines 19-25).

It is obvious that there must exist a means for cooling the high temperature superconductor switching element to switch the switching element back into a superconducting state after turning off the electromagnetic irradiation to provide fast switching speeds.

6. Claims 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303, STELZER DE 19,928,324 A1 and TIDMAN 4,897,558.

Regarding claim 13.

WRIGHT discloses a magnetic coil (6) for storing energy;



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WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303, STELZER DE 19,928,324 A1 disclose a switching element according to one of claims 1 to 9;

WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303, STELZER DE 19,928,324 A1 do not disclose the switching of a switching element (1, 6) leads to a decoupling of the stored magnetical energy.

TIDMAN discloses superconducting device and method for selectively supplying current to a load ( column 1, lines 40-63).

It would have been obvious to one having ordinary skill in the art at the time of this invention to selectively switch the high temperature superconductor switching element to supply the magnetic energy stored in a magnetic coil to the load to supply high energy pulses to the load. Regarding claim 14.

TIDMAN discloses wherein the switching element is arranged as points for a current directing in the normal conducting state the current to an external consumer ( column 1, lines 40-45).

7. Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303, STELZER DE 19,928,324 A1, TIDMAN 4,897,558 and ZOLETA 3,835,369

Regarding claims 15, 20.

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WRIGHT 3,732,438 in view of FURUKAWA JP 09129939A in further view of ZEIGLER 6,317,303, STELZER DE 19,928,324 A1 disclose a switching element according to one of claims 1 to 9;

ZOLETA discloses means for providing an alternating current;

TIDMAN discloses first switching element arranged parallel to inductivity to alternately supply energy to a load.

The above references do not disclose the first and the second switching element are arranged parallel to the inductivity and are alternately operable to stepwise increase the current in the inductive load.

It would be obvious to one having ordinary skill in the art at the time of this invention that in order to stepwise increase the current to a load (current in the inductivity) a second switching element must be arranged in parallel with the first switching element in order to be able to stepwise increase the current.

Regarding claims 16,19.

ZOLETA discloses wherein the means for providing an alternating voltage comprises a transformer (12) and it would be obvious to thermally isolate primary coil from the secondary coil to keep the heat generated by the transformer from effecting the superconductor switching element.

Regarding claim 17.

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ZOLETA discloses electric voltage of amplitude varying with time, or example alternating current ( column 1, lines 1-10).

It would be obvious to one having ordinary skill in the art at the time of this invention to set the frequency and the closing time of the switching element, to satisfy the design requirement for the system.

Regarding claim 18.

ZOLETA discloses generating electrical voltage of amplitude varying with time.

It would have been obvious to one having ordinary skill in the at the time of this invention to arrange the elements of the above references to rectify alternating of an alternating current source.

Regarding claim 21.

It would have been obvious to arrange a transformer for decoupling the alternate voltage and wherein the primary coil of the transformer is thermally isolated from the secondary coil of the transformer.

Refer to claim 13 rejection and claim 19 rejection .

Any inquiry concerning this communication should be directed to Robert L. DeBeradinis whose number is (703) 306-5857. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached on (703) 308-3119. The fax phone number for this Group is (703) 308-7722.

RLD

JANUARY 7, 2003

*Robert J. DeBenedictis*